Reciprocity and Asymmetry

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Background
Reciprocity

Reciprocity is a fundamental behavioral pattern of returning favors and retaliating for losses in social sciences (Mauss 1968, Trivers 1971, Axelrod 1984).


Strong reciprocity: subjects reward those who cooperate and punish those who defect even if they gain no individual benefit from doing so (Fehr et al. 2002, Fehr and Fischbacher 2003, Fehr and Fischbacher 2004, Diekmann 2004).

A lot of evidence on direct reciprocity, strong reciprocity, and indirect reciprocity in settings with symmetric agents.
Reciprocity when people differ

Reciprocity is deeply embedded in many daily interactions, then it is an empirical fact that in most cases reciprocity takes place between asymmetric agents (agents differ in interests, resources, etc.).

What does reciprocity actually mean when people differ?

Until now reciprocity typically studied in behavioral terms: agents reciprocate the behavior of the partner (tit-for-tat, tit-for-two-tat, etc.).

Is not known if agents consider both past behavior and asymmetry when deciding whether to cooperate or help.

To address this question, we analyze reciprocity when there are potential interactions between past behavior and agent heterogeneity in repeated interactions.
Different heterogeneity

Individual properties that are relevant for durable cooperative relations, actors like to differ in these properties (Vogt et al. 2004, 2006):

- cooperation costs
- benefits from receiving support
- likelihood of being in need of support.
The framework
Two-agents interactions

Relationships take the form of asymmetric helping games.

Reciprocity as backward-looking (direct reciprocity)

Adaptive behavior (agents mainly take past behavior into account, although forward-looking payoff calculations are not completely neglected).
The asymmetric helping game
Variation in the costs of giving and the likelihood of needing help.

Symmetry in the form of variation in the costs of helping and in the likelihood of being in need of help.

The likelihood of being in need of help taken as control.

Two approaches of the history of play: (i) the most recent interaction and (ii) the entire story for a given pair of players.

The focal actor is the player who must make a decision to help or not in the current round, while the partner is the player who needs help in the current round.
Hypotheses
hypotheses, partner’s and focal actor’s behavior (last round)

Compared to the case when the partner did not help in the last round, the focal actor is more likely to help in the current round if the partner did help in the last round (direct reciprocity, Andreoni et al 1993, Gächter et al. 2002).

Compared to the case when the focal actor did not help in the last round, the focal actor is more likely to help in the current round if the focal actor did help in the last round (self-consistency, Cialdini 2001, Kunda 2002).
partner’s and focal actor’s asymmetric costs

partner’s helping costs:

- A behavior that involves sacrifices is commonly perceived as nice behavior and consequently reveals kind intentions. A partner with high helping costs undergoes a bigger sacrifice to help than a partner with small helping costs, and consequently helping when costs are high likely signals kind intentions to the focal actor (Rabin 1993, Falk and Fischbacher 2006).

focal actor’s helping costs:

- An increase in the focal actor’s helping costs reduces the focal actor’s willingness to help (Snijders 1996).
Compared to the case when the partner did not help in the last round, the focal actor is more likely to help in the current round if the partner did help in the last round.

- The positive effect associated with helping by the partner increases as the helping costs of the partner increase and the helping costs of the focal actor decrease.

- The negative effect associated with not helping by the partner decreases as the helping costs of the partner increase and the helping costs of the focal actor decrease.
Hypothesis, focal’s behavior and asymmetric costs (last round)

Compared to the case when the focal actor did not help in the last round, the focal actor
more likely to help in the current round if the focal actor did help in the last round.

The positive effect associated with helping is weaker when focal actor’s helping costs
high compared to when focal actor’s helping costs are low.
All hypotheses also applied to entire history of play.

The results include both approaches to the history of play (last round, entire history).
Experiment
Experiment

Experimental Laboratory for Sociology and Economics, Utrecht University, 2008

Computer experiment, real incentives

Subjects played (a)symmetric repeated helping games

Symmetries in terms of helping costs and likelihood of needing help

Each supergame took 8 rounds, each subject played 10 supergames, random match

300 subjects (student population), average age 22, 64% women
<table>
<thead>
<tr>
<th>Label</th>
<th>Concept</th>
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</thead>
<tbody>
<tr>
<td>Probability of being threatened by a loss of points</td>
<td>Probability of needing help</td>
</tr>
<tr>
<td>Giving away own points to overcome other’s threat</td>
<td>Providing help (costs)</td>
</tr>
<tr>
<td>Not giving away own points to overcome other’s threat</td>
<td>Not providing help (no costs)</td>
</tr>
<tr>
<td>Overcome threat and keeping all points</td>
<td>Receiving help (benefits)</td>
</tr>
<tr>
<td>Not overcoming threat and losing all points</td>
<td>Not receiving help (no benefit)</td>
</tr>
<tr>
<td>Condition</td>
<td>Likelihood needing help actor A</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------</td>
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<tr>
<td>0.5</td>
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<td>0.33</td>
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<td>0.33</td>
<td>0.67</td>
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</tbody>
</table>
Results
Results

Random effect logistic regression.

Dependent variable: providing help.

Dependent variables: past behavior, interaction past behavior and asymmetric costs.

Control for other past and future effects: number of rounds, round seven and eight, number of supergame, likelihood of needing help, costs of providing help, interaction of helping costs and likelihood of needing help.

2 models on last round (main effects and interaction effects), 2 models on entire past play (main effects and interaction effects).
<table>
<thead>
<tr>
<th></th>
<th>previous</th>
<th>previous</th>
<th>entire</th>
<th>entire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor provided help, <em>previous</em></td>
<td>1.938***</td>
<td>3.394***</td>
<td>1.447***</td>
<td>1.526***</td>
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<tr>
<td>Factor did not help, <em>previous</em></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Factor received help, <em>previous</em></td>
<td>2.852***</td>
<td>1.877***</td>
<td>2.496***</td>
<td>2.561***</td>
</tr>
<tr>
<td>Factor was denied help, <em>previous</em></td>
<td>-0.415*</td>
<td>-1.713***</td>
<td>-0.536**</td>
<td>-0.496*</td>
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<tr>
<td>Factor provided help, <em>entire</em></td>
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<td></td>
<td>0.590*</td>
<td>0.532*</td>
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<tr>
<td>Factor did not help, <em>entire</em></td>
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<tr>
<td>Factor received help, <em>entire</em></td>
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<td>2.220***</td>
<td>2.234**</td>
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<tr>
<td>Factor was denied help, <em>entire</em></td>
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<td>-0.689*</td>
<td>-0.603*</td>
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<tr>
<td>Helped * focal's costs, <em>previous</em></td>
<td>-0.138***</td>
<td>-0.126*</td>
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<tr>
<td>Received * partner's costs, *previous</td>
<td>0.104**</td>
<td>0.081*</td>
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<tr>
<td>Denied * partner's costs, *previous</td>
<td>0.131**</td>
<td>0.093*</td>
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<td>Helped * focal's costs, *entire</td>
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<td></td>
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<tr>
<td>Denied * partner's costs, *entire</td>
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<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yes costs focal actor</td>
<td>-0.136***</td>
<td>-0.031</td>
<td>-0.157***</td>
<td>-0.078***</td>
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<tr>
<td>Yes giving help focal actor</td>
<td>1.598***</td>
<td>1.624***</td>
<td>1.002*</td>
<td>1.161**</td>
</tr>
<tr>
<td>Yes sound</td>
<td>-2.397***</td>
<td>-2.428***</td>
<td>-2.134***</td>
<td>-2.186**</td>
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<tr>
<td>Yes parent</td>
<td>0.731*</td>
<td>-0.379</td>
<td>1.858***</td>
<td>0.937</td>
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<tr>
<td>Yes Constant</td>
<td>-0.014</td>
<td>-0.018</td>
<td>0.083</td>
<td>0.097</td>
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</table>
Summary and outlook

People do not simply condition on past behavior as assumed by direct reciprocity models. Factors also account for differences between themselves and others, although asymmetry effects fade away further back in the past.

Next step: clarify the effects associated with focal actor’s costs versus partner’s costs and intentions.

Future plan: Simulations, robustness tests (further experiments), asymmetric backward-looking reciprocity model.
Thank you for your attention


Itilevel Logistic Regression with Random Effects

Subject i’s decision whether or not to provide support depends on:

- general willingness to provide support (θ)
- decision situation (η).

\[ y_{ijt} = 1 \mid \theta_i, \eta_t \] \[ = \frac{e^{\theta_i - \eta_{jt}}}{1 + e^{\theta_i - \eta_{jt}}} \]

i, t (prob that i provides help in condition i, at time t) = \( c_l + \beta_{1it} + \beta_{2it} + \beta_{3it} + \text{control} \)